**Comprehensive Multiaxial Hierarchy of**

**Psychiatric and Neurological Assessment Tools in OMOP CDM**

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**Abstract**

*On behalf of OHDSI Psychiatry Working Group, we would like to put forward a proposal to build the comprehensive multiaxial hierarchy for psychiatric and neurological assessment tools in OMOP CDM. This will allow researchers and physicians to generate evidence-based decisions in Neurology and Psychiatry on an equal footing with other healthcare professionals.*

**Research Category:** Observational data management

**Introduction**

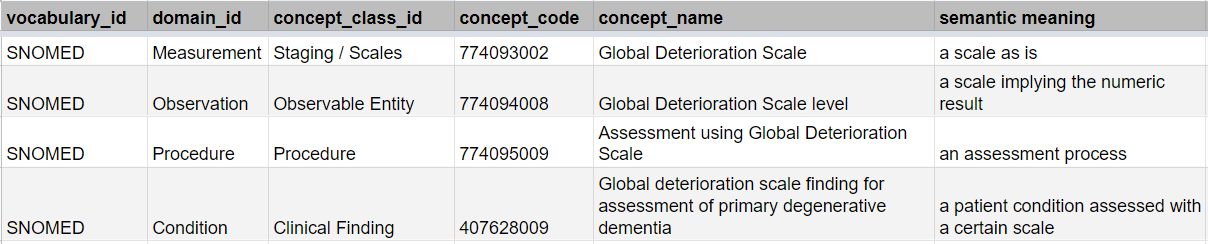
According to the World health report provided by WHO, mental disorders affect one in four people during lifetime1. However, in the context of COVID-19, each of us is exposed to the increased psychological stress that changes statistics significantly. In parallel, the increased need in the comprehensive study of COVID-19 influence on the human organism poses new challenges to psychiatrists and neurologists around the world. Thus, staying on guard of OHDSI collaborators’ calm, the OHDSI Psychiatry working group2 continues to work on the data harmonization process across the area of Mental Health and the improvement of OMOP Common Data Model and Standardized Vocabularies from the perspective of the pandemic.

**Challenge**

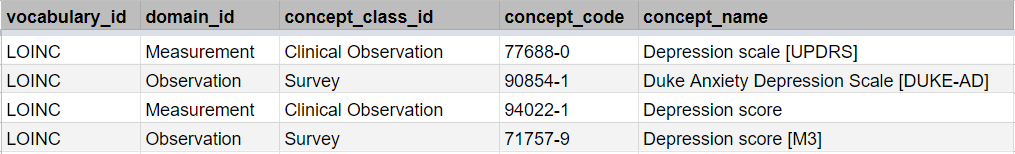
The greatest challenge of psychiatric and neurologic assessment instruments such as scores and scales are their current representation in the OMOP CDM owing to architectural singularity and limited adaptiveness of Gold Standard Ontologies3. As a result:

1. A lot of tools do not have any Standard equivalent, even if they are widely used and not burdened by licenses (e.g. Hamilton Anxiety Scale4).
2. Scales represented in OMOP Vocabularies often have multiple standard equivalents in different domains and vocabularies5 (Tables 1 and 2), but the only one concept for a particular measurement should be chosen.

**Table 1.** Examples of multiple semantic axes in SNOMED for one psychiatric assessment scale.

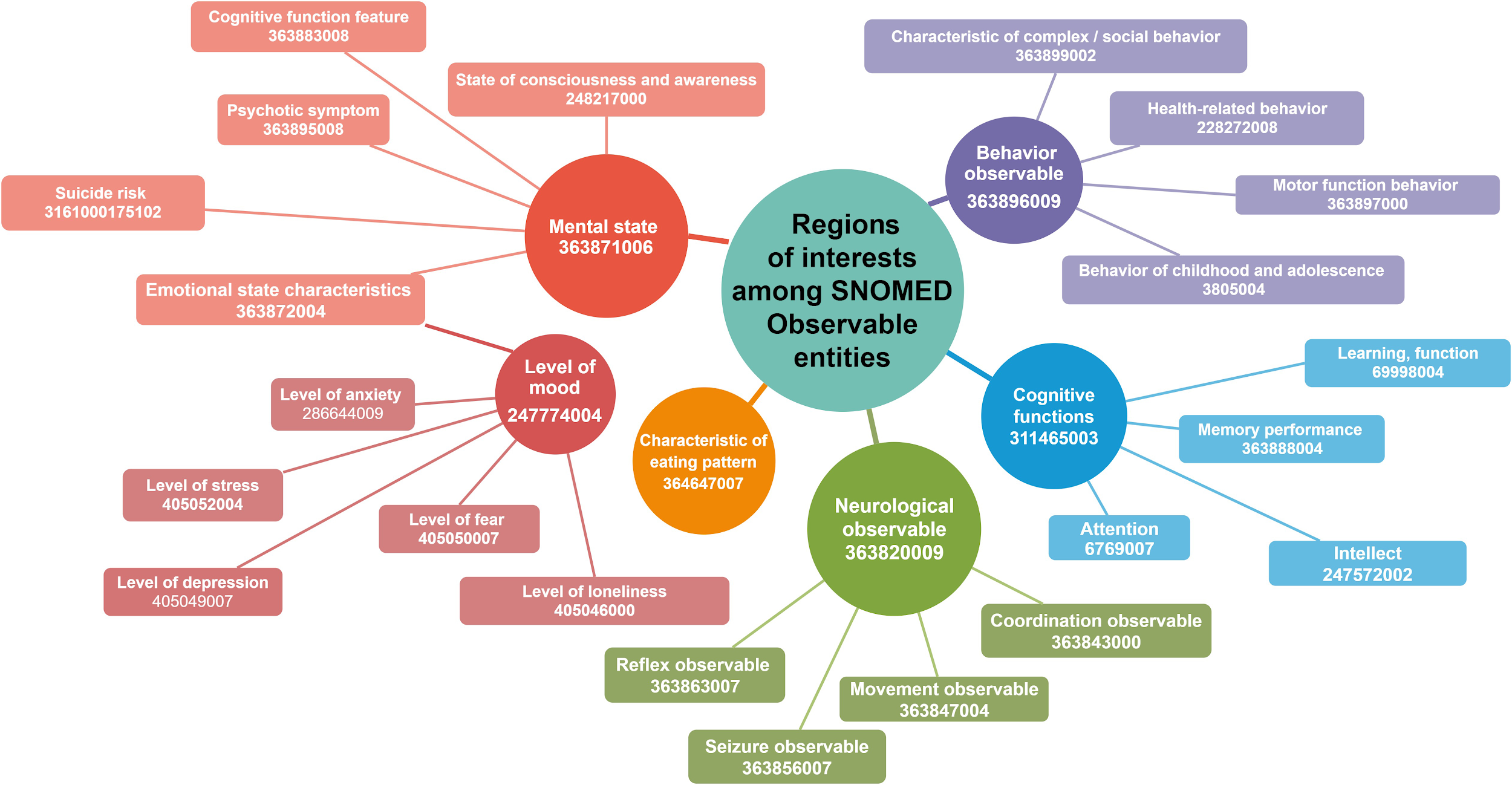


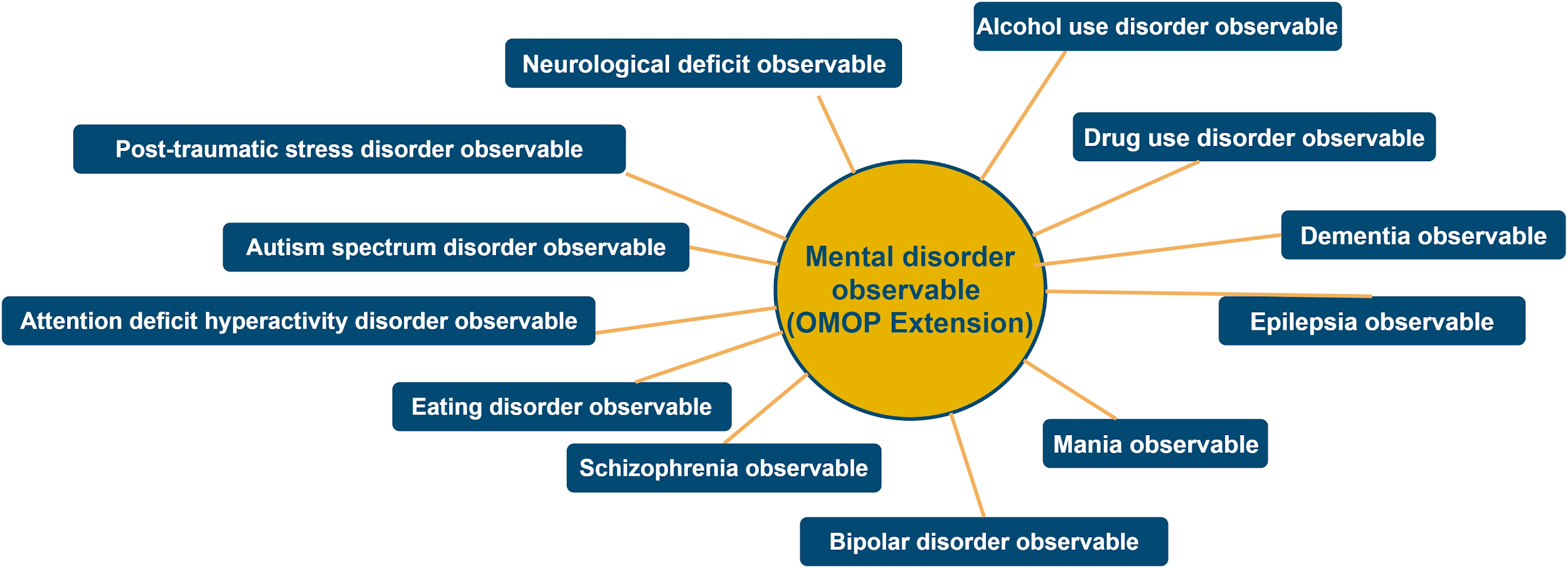
**Table 2.** Examples of unpredictable domains’ behavior in LOINC for psychiatric assessment tools.



**Solution**

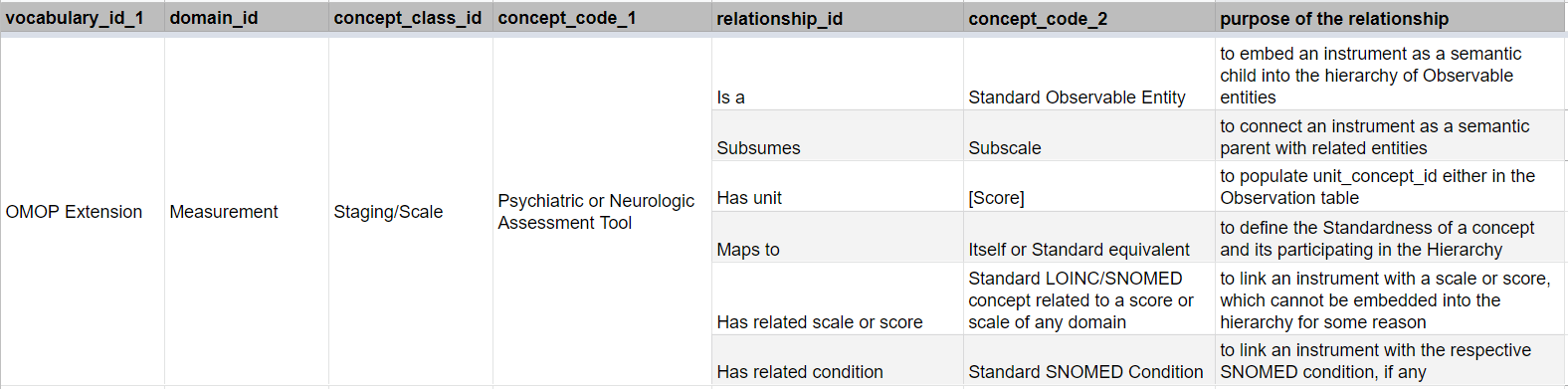
1. To define regions of interests among Standard Observable entities as a basis for psychiatric or neurologic assessment tools’ hierarchy (Figure 1).
2. To extend the pool of Standard Observable entities adding concepts representing nosological categories to the OMOP Extension (Figure 2).
3. To collect the scales used in patient data. Map them to OMOP concepts. Identify those not having equivalents in OMOP.
4. To add psychiatric or neurologic assessment instruments as new OMOP Extension concepts and build the hierarchy using a particular set of relationships as shown in Table 3.

**Figure 1.**Regions of interests in Neurological and Psychiatry assessment tools. 

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**Figure 2**. Possible enrichment of the SNOMED Observable entities hierarchy by OMOP Extension.

**Table 3.** The set of potential relationships for Psychiatric or Neurologic Assessment Tools in OMOP Extension vocabulary

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**Conclusion**

The implementation of the proposed approach will make Psychiatry or Neurology-related observational cohort studies based on OMOP CDM effective and comfortable. Also, the multiaxial hierarchy for neurological and psychiatric assessment tools can increase the sample size through the automatic expansion of the concept set coverage.

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